RI-5144
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OPTICAL FIBER ANALYZER

AQ-7110

OPERATION GUIDE

Technology and Vitality

ANDO

ANDO ELECTRIC CO.,LTD.

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AQ-7110
OPTICAL FIBER ANALYZER
OPERATION GUIDE

ANDO ELECTRIC CO., LTD.
TOKYO, JAPAN

INTRODUCTION

Thank you for selecting the AQ-7110 Optical Fiber Analyzer. Ando's optical fiber analyzer have found wide use in the research and development, manufacture, installation, and maintenance of optical communications and other fiber-optics based systems. The AQ-7110 Optical Fiber Analyzer promises to fulfill your expectations just as its predecessors did. To obtain optimum performance from the AQ-7110, it is essential that this manual be carefully read and understood.

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I BUTTON FUNCTIONS (See Figure 1)

NOTE: Many buttons on the AQ-7110 perform dual functions. The additional function is indicated by green labeling below the button and is activated by pressing the 2nd key "ON". These "2nd" functions are in parentheses below.

MEASUREMENT

1: PREVIEW — Activates laser putting OTDR in the "REAL TIME" mode.

2: START/STOP — Initiates signal averaging. Can be used to stop averaging at any time. After processing is completed, pressing again activates continuous averaging.

RANGE (Active only in the preview state)

3: DOWN — Decreases distance range setting.

(CURSOR +/I) — Horizontal cursor is removed or added.

4: UP — Increases distance range setting.

(GHOST) — Activates GHOST (secondary reflected light) identification function.

MARKER

5: 1 — Place first marker.

(LABEL) — Activates labeling mode. (16 characters)

6: 2 — Places second marker. Also used for AUTO-SPLICE loss mode.

(ENTER) — Enters label character and advances label cursor.

7: 3 — Places third marker.

(BACKSPACE) — Backspaces label cursor.

8: Y — Allows re-positioning of "Y" marker.

9: CLEAR — Removes markers and cursors.

(CLEAR) — Clears labeling.

MEMORY

10: MASK	—	Allows Fresnel reflection masking. 20 points.
11: WAVE FORM	—	Allows storage of processed waveform.
12: STORE	—	Used in conjunction with Waveform, Mask and File storage.
13: RECALL	—	Used to recall waveforms and files.
(FILE)	—	Activates file storage. (6 available)
14: CLEAR	—	Used to clear mask points.

dB SCALE

15: LOW	—	Reduces vertical scale.
16: HIGH	—	Increases vertical scale.

DISTANCE SCALE

17: LOW	—	Reduces horizontal scale.
(REF)	—	Sets reference point at cursor location.
18: HIGH	—	Increases horizontal scale.
(LSA/TPA)	—	Allows choice of measurement method.
19: VERTICAL POSITION	—	Allows vertical positioning of waveform.
20: HORIZONTAL POSITION	—	Allows horizontal scrolling of waveform.
21: INITIALIZE	—	Returns waveform appearance to initial state.
(IOR)	—	Allows setting of refractive index.

GP-IB

22: LOCAL	—	Switches from remote mode to local operation.

PLOT

23: ON	—	Activates external plotter.(HP-7475A)

GAIN

24:/25: UP/DOWN — Used to adjust receiver gain.

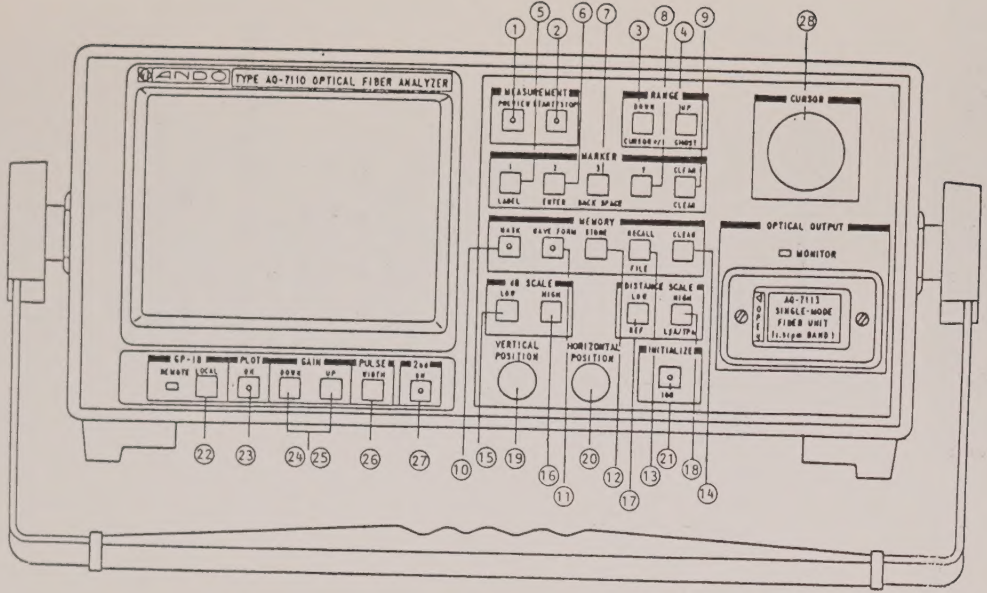
PULSE

26: WIDTH — Changes pulse width settings.

2nd

27: ON — Used to change between 1st and 2nd function.

28: CURSOR — Controls cursor and index of refraction changes, etc.


ANDO
TYPE AQ-7110 OPTICAL FIBER ANALYZER
MEASUREMENT
PREVIEW
START/STOP
RANGE
DOWN
UP
CURSOR x/1
GHOST
CURSOR
MARKER
LABEL
ENTER
BACK SPACE
CLEAR
MEMORY
MASK
SAVE FORM
STORE
RECALL
CLEAR
FILE
OPTICAL OUTPUT
MONITOR
AQ-7113
SINGLE-MODE
FIBER UNIT
(1.31μm BAND)
dB SCALE
LOG
HIGH
DISTANCE SCALE
LOW
HIGH
REF
LEAST/PK
VERTICAL POSITION
HORIZONTAL POSITION
INITIALIZE
GP-IB
REMOTE
LOCAL
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GAIN
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PULSE
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Figure 1

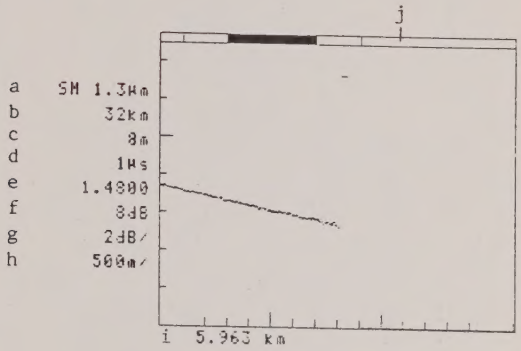

Figure 2

a. Plug-in wavelength
b. Selected distance range
c. Distance resolution
d. Optical pulsewidth
e. Refractive index
f. Gain setting (Attenuation is indicated)
g. Vertical axis scale
h. Horizontal axis scale
i. Distance from starting point of waveform to left edge screen.

J. Relative location of magnified portion of display.

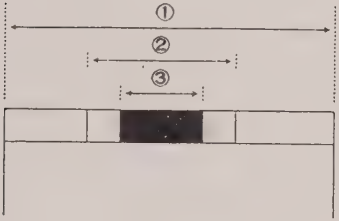

Figure 3

① Indicates the fullscale distance range.
② Indicates sample area. Signal level must not be saturated.
③ Portion of range available for display.

CURSOR (A) km	(D) dB/km	(G) dB/km
SP. LOSS (B) dB	(E) dB	(H) dB
1-3 LOSS (C) dB	(F) km	(I) km

Figure 4

A. Total distance to cursor
B. Splice loss
C. Loss between markers 1 and 3 (or 1 and 2)
D. Average loss per km between markers 1 and 2
E. Actual loss between markers 1 and 2
F. Distance between markers 1 and 2
G. Average loss per km between Y and marker 3
H. Actual loss between 2 and marker 3 (Does not include splice loss).
I Distance between marker 2 and 3.

III INITIAL SET-UP

3.1 Bare fiber adaptors are not recommended.

3.2 Pigtails and jumpers should be cleaned before connecting to OTDR.
Note: Access to internal jumper may be gained by loosening screws on each side of connector cover. Pull out and remove connector for cleaning. Be sure to tighten snugly when reinstalling.

3.3 Intensity of CRT may be adjusted by tuning control located under the power switch.

3.4 Set Refractive Index
1. Press 2nd (LED on) – Press IOR
2. Note backlit label on CRT Adjust with cursor knob.
3. Press 2nd (LED off) to lock setting

IV OPERATION

4.1 Slide connector cover to the left. Attach fiber to be tested after cleaning connector.

4.2 Press PREVIEW to actuate laser.

4.3 Choose distance range setting that corresponds to fiber length by using the RANGE UP/DOWN keys. Pulse width and gain will automatically be set appropriate to the distance range.

CAUTION: To guarantee the maximum amount of accuracy in measurement, and to further avoid the influence of secondary reflection, select a range whose maximum measurable distance is at least double the length of the optical fiber to be measured.

4.4 Press PULSE W!DTH key. Choose setting which best suits your test situation.

4.5 Adjust receiver gain, if necessary, by using GAIN UP/DOWN keys. CRT display should look similar to Figure 5. If no trace appears, refer to paragraph 3.2.

Figure 5

4.6 Press START/STOP, to initiate signal processing. "PROCESSING" will display on the screen, then disappear when complete. This key may be used to start/stop processing at any time.

v SPLICE LOSS MEASUREMENT

5.1 To make automatic splice loss measurements:

1. Place cursor at leading edge of splice step (Figure 6) Refer to Expansion section of this text if splice is difficult to locate.

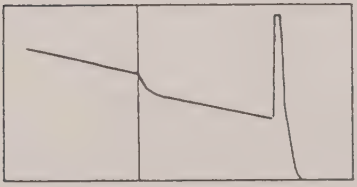

Figure 6A Fusion Splice

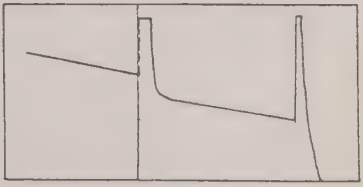

Figure 6B Mechanical Splice

2. Press MARKER 2 until markers appear on a linear position of the trace, as shown in Figure 7. Splice loss information will appear on the screen.

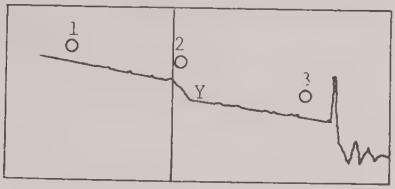

Figure 7

3 Press CLEAR Move cursor to next splice. Pressing CLEAR a second time removes the cursor.

5 2 Each marker may be positioned manually. Move the cursor to the desired marker location and press the appropriate key. See Figure 7.

VI WAVEFORM EXPANSION

6 1 To locate low loss splice points or make more accurate distance measurements, follow the steps below.

1 Place cursor at the area to be examined. Adjust by using dB Scale and/or Distance Scale keys LOW/HIGH. Expansion and reduction are performed around the cursor line in the center.

2 Press INITIALIZE to return to original screen.

6 2 Maximum distance resolution (0 5m) is achieved in the Preview state.

1. Place cursor at the area to be examined.
2 Press Distance HIGH until 0.5m appears in resolution indicator
3 Press START/STOP to improve signal to noise ratio.
4 Press PREVIEW, INITIALIZE to return to initial state.

VII MASKING

7.1 Masking is used to eliminate the effects of photo-detector saturation caused by Fresnel Reflection occurring at mechanical splice points. Masking allows narrower fresnel dead zone and more accurate measurement. See Figure 8.

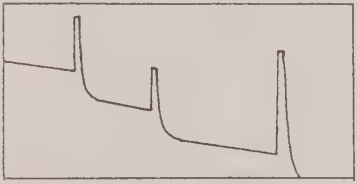

Figure 8A Unmasked

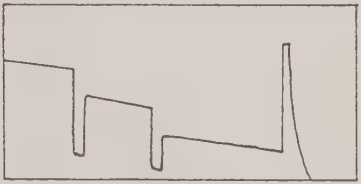

Figure 8B Masked

7.2 To set masking points (20 available):

1. Press PREVIEW.
2. Place cursor at the leading edge of the reflection.
   Press MASK (LED on), then press STORE.
3. If more points are to be masked, move cursor and press STORE again.
   When finished, press mask (LED off) all musk points are memorized.
4. To clean all mask points, press MASK → CLEAR → MASK.

VIII STORAGE FUNCTIONS

8.1 Waveform storage – This function can be used to set up a reference fiber to which other fibers can be compared.

To store reference fiber:

1. Press START/STOP to process waveform.
2. After processing has finished, press WAVEFORM, STORE to retain all waveform conditions in memory.

To make comparison:

1. Attach next fiber and press START/STOP to process.
2. Press WAVEFORM, RECALL to view the reference fiber.
3. Pressing RECALL again returns the screen to the current fiber under test.
4. Continued pressing of RECALL alternates the waveforms on the CRT.

8.2 File Storage – Six files are available for storing conditions of measurement, display and calculation. Marker settings can be recalled and will appear on the current waveform under examination.

1. After setting markers, press 2nd (LED on), then FILE.
   The file number will appear as a backlit number in the lower left corner.
2. Choose file number by rotating cursor knob. The "*" to the right of the file number indicates previous stored information.
3. Press STORE.
4. Recall by repeating steps 1 and 2. Then press RECALL. Previously stored information is cleared when new information is stored. The contents are also maintained even when power is off.

IX SPECIAL FUNCTIONS

9.1 Labeling – Sixteen (16) characters are available on the CRT for labeling job numbers, fibers, etc. To store characters:

1. Press 2nd, LABEL.
2. Choose backlit character with cursor knob.
3. Press ENTER. Backlit prompt will move a space for next character.
4. Press 2nd to lock in characters of choice.

To clear characters:

1. Press 2nd, CLEAR, 2nd.

9.2 Reference – A distance reference point may be chosen which reference the cursor to that point. The procedure is as follows:

1. Set cursor at desired point.
2. Press 2nd, REF, 2nd.
3. Remove by clearing the cursor, then 2nd, REF, 2nd.

9.3 [Km - Mile] switch

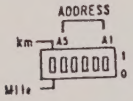

Figure 9

The [Km - Mile] switch selects the unit of distance, either Km or miles,.which is on the left side of the DIP switch on the rear panel.

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